Where are we with IPv6?

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Running out of IPv4 ?

- Who cares ?
- Predictions are good, but tend to be inaccurate and can be misleading
- Market and policy could make any resource to stay or vanish
- Let's stop discussing about that. The message should be:
  - Start now with IPv6 !
- **A Pragmatic Report on IPv4 Address Space Consumption (Internet Protocol Journal - Volume 8, Number 3, September 2005):**
  - "At some point in the future, perhaps in the 2008–2010 timeframe, we should plan to turn on IPv6 networking capabilities throughout our networks, and this means gaining experience with IPv6 on a smaller scale in 2005–2007 in our networks, in server applications, and in user systems. Turning down IPv4 capabilities, which is the endpoint of such a transition, is a business decision that does not need to be made hastily; we should presume that coexistence will be important for a decade, and probably more."
- I will add:
  - "this point in the future is today already for some people"

What we did, what we do ?

- We have invested some years in IPv6 R&D (with some public funding)
  - Helped to improve the protocol
  - Disseminated results
  - Created lots of expertise
- We now in return for the community contribution, help with deployment
- We are not just researchers (have real customers)

How we help ?

- Training people
- Looking at their networks
- Helping to decide convenient transition paths
- Contacting upstream providers
- Providing support at every step
- Doing internal pilots and then with customers
- Helping to look for business perspectives
- Following the chain …

What we found ? (1)

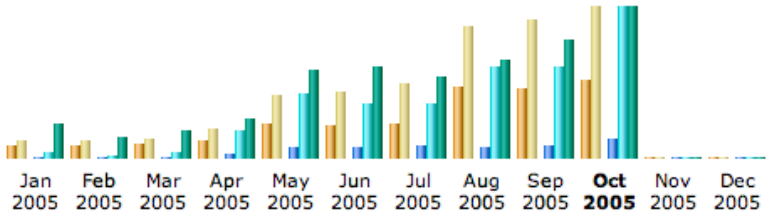
Summary

Reported period	Month Oct 2005
First visit	01 Oct 2005 - 00:00
Last visit	26 Oct 2005 - 19:00

	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Viewed traffic *	**12689**	**24434** (1.92 visits/visitor)	**142752** (5.84 pages/visit)	**1143735** (46.8 hits/visit)	**9.74 GB** (417.99 KB/visit)
Not viewed traffic *			**245741**	**247001**	**11.64 GB**

* Not viewed traffic includes traffic generated by robots, worms, or replies with special HTTP status codes.

Monthly history



Month	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Jan 2005	2032	2720	7139	43906	2.18 GB
Feb 2005	2009	2750	5613	23194	1.40 GB
Mar 2005	2244	3114	7187	44118	1.74 GB
Apr 2005	2830	4683	30648	208131	2.58 GB
May 2005	5541	10211	77940	486097	5.63 GB
Jun 2005	5164	10646	87319	412163	5.86 GB
Jul 2005	5535	12074	100551	418684	5.21 GB
Aug 2005	11478	21216	88812	697562	6.31 GB
Sep 2005	11156	22463	94539	693432	7.65 GB
Oct 2005	12689	24434	142752	1143735	9.74 GB
Nov 2005	0	0	0	0	0
Dec 2005	0	0	0	0	0
Total	60678	114311	642500	4171022	48.32 GB

- IPv6 is happening in the industry
  - Daily news about that
- Interest in IPv6 is increasing
  - http://www.ipv6tf.org

What we found ? (2)

- IPv6 traffic is growing

Summary

Reported period	Year 2005				
First visit	01 Jan 2005 - 00:06				
Last visit	15 Sep 2005 - 02:43				
	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Viewed traffic *	**<= 21405** Exact value not available in 'Year' view	**30080** (1.4 visits/visitor)	**83671** (2.78 pages/visit)	**666071** (22.14 hits/visit)	**128.79 GB** (4489.71 KB/visit)
Not viewed traffic *			**76618**	**84628**	**256.29 GB**

* Not viewed traffic includes traffic generated by robots, worms, or replies with special HTTP status codes.

Summary

Reported period	Year 2005				
First visit	01 Jan 2005 - 12:25				
Last visit	14 Sep 2005 - 18:37				
	Unique visitors	Number of visits	Pages	Hits	Bandwidth
Viewed traffic *	**<= 719** Exact value not available in 'Year' view	**1058** (1.47 visits/visitor)	**4747** (4.48 pages/visit)	**45964** (43.44 hits/visit)	**10.38 GB** (10290.2 KB/visit)
Not viewed traffic *			**619**	**792**	**2.64 GB**

* Not viewed traffic includes traffic generated by robots, worms, or replies with special HTTP status codes.

  - More to come in few months

What we found ? Buts …

- Lot's of myths
  - Not talking about "protocol technicalities"
- Some big folks not ready

Some of the Myths

- Generic fear to anything new/unknown
  - Natural human reaction ☺
- IPv6 is difficult
  - Not really true, but anything new takes time
- Moving to IPv6 is expensive
  - Planning is the question
- IPv6 don’t provide new business
  - Do you care about losing customers ?

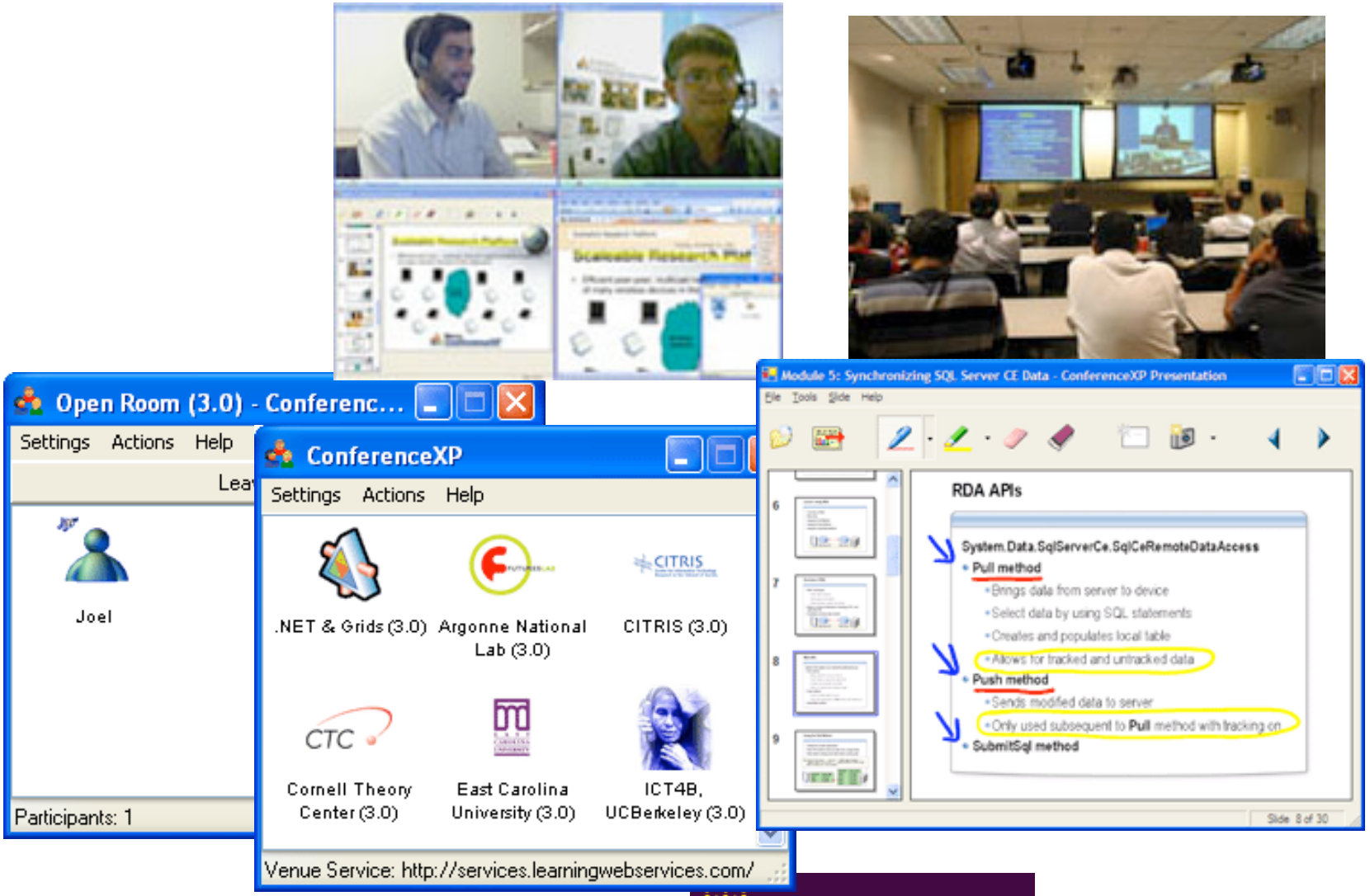
The New Business

- Customers don't pay for protocols
  - Transit for applications and services
  - Hundreds (thousands or even millions) of smart devices, appliances, gadgets, consumer electronics, etc.
  - Easier life, Plug & Play, not reading manuals
- Applications work better end-to-end
  - Lower development and deployment cost
  - Lower operational and support cost
- ISPs make more money from services than with "protocols" or IP addresses
  - Bundle apps. and broadband
  - Increase of broadband demand
  - Make customers more "network dependable"
    - They will pay then also for better SLAs

Who want to make the business ?

- The new Internet boom is coming
  - IPv6 is an innovation enabler: Everything connected
- Let's make networks simpler
  - End-to-end, intelligence to the edge
- Allows everyone to develop applications
  - ISPs could be the reselling channel
- If ISPs don't make the business, someone else will make using their network for free
  - Transition mechanisms allow that, so you decide

Service example: ConferenceXP



Waking up people & networks

- LAC case
  - Over 3.000 people trained in the last 9 months
  - Not just ISPs, also application developers
- The IPv6 Tour
  - http://ipv6tour.lacnic.net
- Some results:
  - From 18 prefixes at the end of June (most of them not announced) up to 45 at the end of September (already being used or in the way to)
  - Significant deployment cases, some commercial
  - Chain followed to make sure that they get IPv6 connectivity all the way thru …
  - High level of interest from government organizations and regulators, but also enterprises, developers, etc.

However …

- There is a significant difference depending on who are the upstream providers ☹
- Europeans are able to offer native IPv6 service in just hours
- Some big US providers only offer tunnels and there are some routing concerns
  - Following the chain, some other US ISPs also depend on those big players …
- More IPv6 customers outside NA or just more service available ?

Do you care your customers ?

- We have requested connectivity and roadmaps to lots of transit providers
  - Not many even take the time to reply …
- So, don't tell us
  - "there is not a business case"
  - "there is no customer demand"
- We want to help
  - Need your cooperation
- We have a commitment with our customers
  - Need to answer their questions

Planning Ahead

- Take advantage of early deployers
- Incremental upgrade with the demand
- Native is good, but transition mechanisms work well when properly setup, specially for the access network
  - Inexpensive, zero O&M cost
- IPv6 is coming as an added-value when you upgrade your network for other reasons

Where are you with IPv6

- How many in the room believe is not going to happen ?
- How many don’t have an IPv6 prefix already ?
- From those that have a prefix, how many aren’t announcing it yet ?
- For both of you:
  - What are you waiting for ?

Count on us !

- This is not an advertisement
- Is an offer for helping you to move on
  - Because this way we also help our customers
- There is no associated cost

NANOG list comments

- Consumer routers with 6to4
  - Already there !
- Reclaiming not-used address space
  - Cost/effectiveness/time …
- Some people moving to IPv6 to manage their networks
  - Some cable operators already got more IPv4 space because net 10 is short for them
- IPv6 is painful for the user
  - More than NAT ? Or we want to say painful for ISPs because is easy to say so when something is new for us ?
- Just wait for a popular adult-content-provider offering website-access for free via IPv6
  - No comments !

Conclusions

- Delaying the inevitable don't seems the best approach to me, instead, preparing everything ahead of time, helping to reduce the cost
- Do we charge to our customers when we solve a bug or problem in our network? IPv6 was invented to solve a "bug" in IPv4:
  - The lack of enough addresses
- Having more services and apps running into our networks will mean more revenue … depending on your business model
- May be instead of getting a new check for the IPv6 service, not providing it, you will lost some checks from existing customers who demand dual stack ;-)
- Business is also “to be competitive”, and other carriers already have the service as a value added to the existing IPv4 customers
- The cost of NOT being prepared for IPv6 is vastly higher than the cost of easing into it
- Make sure to plan ahead and order any new equipment with IPv6 on it

Thanks !

- Questions ?

- **The IPv6 Portal**

  http://www.ipv6tf.org